Washington State Department of Transportation

Memorandum

December 6, 2004

TO: John F. Conrad
MS 47316

FROM: Kevin J. Dayton/Ron Howard
705-7821/705-7823

SUBJECT: CRIPs
Contractors' Cost Reduction Incentive Proposals
Experience During Year Ending 9/30/04

This report has been prepared to cover the twelve-months period from October, 2003 through September, 2004.

Value Engineering in the Construction area took a big jump over last year's dollar value. While the number of proposals approved during this period remained steady compared with the previous report, the savings to the State quadrupled. This increase is primarily caused by a couple of big proposals on the Narrows Bridge project and some healthy savings on the Weyerhaeuser Way project on SR 18. We continue to pursue savings in this arena, but the future is not looking so rosy. We are reviewing only seven additional proposals.

The results are as follows:

| Period | Approved | Savings to the State | Removed from List |
|---|---|---|---|
| **Oct 2003 – Sept, 2004** | **17 proposals** | **$1,275,236** | **5 proposals** |

These are the actual savings of the proposals in terms of money. Two of these approved ideas also included reductions in contract time. Reduced durations save administrative costs for both WSDOT and the Contractor and provide a major benefit to the traveling public. All of these proposals also include a transfer of the constructability risk from WSDOT to the Contractor. These risk transfers, together with the evidence of teamwork and partnering that CRIPs represent, provide intangible benefits in addition to the face value of the proposals.

We should point out that, of the 13 upcoming proposals listed in the last report for the SR 18 job at Maple Valley, 12 have disappeared. Due to overoptimistic enthusiasm, these were listed prematurely and could never have become valid CRIP agreements.

By comparison, CRIP savings in the previous year were $307,136. Looking to the future, we are currently reviewing 7 CRIPs.

Included in the report for the first time are "VE" proposals from the Narrows Bridge project. The Design-Build/Negotiated Lump Sum project at the Tacoma Narrows contains provisions for "Value Engineering Proposals." A "Value Engineering Proposal" proposes a change from specific scope or design standards without impairing essential functions or characteristics of the project. The result is a shared cost savings change order. In a design build contract the Design Builder has the ability to innovate design elements as well as constructability related elements to achieve a cost savings through efficiencies gained. When this innovation violates scope or design standards a Value Engineering C.O. is required. As a result they are not exactly the same as Design Bid Build CRIPs however, they have much the same effect on the project. We have decided to track the VE proposals and report them here with the conventional CRIPs.

A description of the accepted CRIPs and their potential application to future designs is attached.

KJD/RH:cd
Attachments (report and spreadsheet)

cc/att: Dan Mathis, FHWA, 40943
Tony Allen, 47365
Jugesh Kapur, 47340
Don Nelson, 47324
Harold Peterfeso, 47330
Toby Rickman, 47344
Greg Selstead, 47325
Ken Smith, 47329
Jim Walter, 47365
Ralph Robertson, Eastern Region
Dan Sarles, North Central Region
Ron Paananen, NW Region, NB82-240
Steve Roark, Olympic Region, 7440
Phil Nickson, South Central Region
Glenn Schneider, Southwest Region, S-15
Craig Stone, UCO, NB82-250

# APPROVED CRIPS – Period Ending 9/30/2004



**DELETION OF UNNEEDED CONCRETE SAVES $$**
(C-6317, C.O.15)

This structures project in downtown Bellevue included median barrier to tie into freeway bridge columns. The barrier detail showed concrete to the same depth as the top of pier footing. This mass of concrete is unnecessary for the function of the barrier. The extra concrete was deleted at a gross savings of nearly $9,000, with the State's share amounting to $4,300. This was likely a simple detailing error in the plans. Careful checking of the details could have yielded 100% of the savings, or an additional $4,000.

**QUICK MOVEABLE BARRIER NOT NEEDED**
(C-6317, C.O.18)

The same project (NE 8th St Undercrossing of SR 405) in downtown Bellevue also contained provisions for the use of Quick Moveable Barrier. This product, to have been furnished by the State, is the well-known "zipper" that allows barrier to be placed and removed quickly. The planned application of this product was in a location that could be adequately served by simple temporary barrier. The Contractor's proposal to utilize temp barrier saved over $45,000, with the State's share at $22,550. This proposal depended heavily on the Contractor's approach to the work and his willingness to work around the semi-permanent barrier installation. It would not be beneficial to try to forecast this idea during design.

**ELIMINATING BICYCLE TUNNEL SAVES BIG DOLLARS**
(C-6441, C.O.19)

This first accepted VE proposal for the Narrows Bridge project replaced specific scope, a tunnel for bikes and pedestrians, with a surface route crosswalk with an island and pedestrian/bicyclist activated warning lights. The gross savings of nearly a quarter of a million dollars was split with the State realizing a dollar savings of $114,314. In addition to the contract dollar savings the proposal relieved security concerns of the local community, the local bicycle club preferred the proposal and the department would realize future savings in maintenance costs. The tunnel would have required lighting and dewatering. Seeking and attaining acceptance of the proposal from the local bicycle group and addressing their concerns were conditions of acceptance.

**SURFACE ACCESS CHEAPER THAN A TUNNEL**
(C-6441, C.O.21)

An even bigger savings was proposed by the Tacoma Narrows Constructors Contractor with regard to a scope requirement for a tunnel providing maintenance access to the relocated sewer pump station. Upon advancing the design, the location of the pump station and the suspension bridge design was such that the access road could be safely routed under the bridge and around the anchorage. The revised route required slope stabilization, detention pond modifications and additional roadway length. The realigned access road will meet the functional intent of the contract with less maintenance concerns associated with maintaining tunnel. The overall contract dollar savings exceeded $1 Million, with the State's share at $543,003.

**SEISMIC UPGRADE OF EXISTING TRUSS MEMBER NOT REQUIRED**
(C-6441, C.O.47)

A minor feature of the Tacoma Narrows project was the upgrading of a top lateral member of an existing stiffener truss at Pier 6 of the old bridge. Upon advancing the design, this member proved to be adequate for the prescribed loading for the seismic renovation. Accordingly, the Contractor proposed the deletion of this part of the scope of the Design-Build agreement. The State's share of the resulting savings was negotiated at $1,155.

**WALL DELETION EXPEDITES RAMP OPENING**
(C-6441, C.O.49)

The Tacoma Narrows project includes a split diamond interchange, one half of which is at 36$^{th}$ Street feeding the eastbound approach to the new bridge. The prescribed scope called for a substantial retaining wall along the on-ramp to preserve existing trees. The design builder proposed deleting this wall and replacing it with a stabilized cut slope, including landscaping. Although this approach necessitated that more trees be cut, the proposed extensive tree planting replaced the removed trees a couple times over. This proposal was accepted for several reasons besides the relatively modest cost savings. The redesign would allow an earlier ramp opening, is superior in terms of safety (recovery area and sight distance) and aesthetics (softer, landscaped appearance.) The State's share of the savings was negotiated at $62,500.

**REVISED SAFETY SYSTEM PROVIDES ALL-AROUND IMPROVEMENT**
(C-6444, C.O.50)

This project is the repair, rehabilitation and re-decking of the Columbia River Bridge connecting Longview with Rainier, Oregon. Funded in a joint venture with Oregon DOT, the job included upgraded safety measures for future maintenance. Among these were fall protection and ladder systems on the upper trusses of the bridge. The Contractor proposed an alternate to the plan systems that would utilize stainless steel cables instead of a top rail tie-off system. The revised system is judged to be superior in performance and offers the added benefit of a significantly reduced weight. The State's share of the savings over this proposal turned out to be $81,605. Had WSDOT designers discovered this system during the planning stages, the entire savings could have been realized.

**IN WATER POLLUTION, PREVENTION IS CHEAPER THAN THE CURE**
(C-6469, C.O.13)

This project, funded by Sound Transit and constructed by WSDOT, will create a transit-only interchange with I-5 in Lynnwood. The project site is in an environmentally sensitive area with Scriber Lake Creek passing through the work area. The original plans called for special equipment to remove silt from stormwater during construction activities. The "Chitosan" sand filtration system works on water that is already silted. The Contractor proposed to eliminate the Chitosan and, instead, install measures that would prevent the water from becoming silted by the construction work. The prevention measures included silt fencing and sod-lined ditches. We do not criticize the design selection as the provision of water quality treatment in the contract represented the lowest risk to Scriber Lake Creek at the pre-bid stage. Only when the Contractor is identified, and is ready to assume the responsibility for performance, is the prevention approach worth considering. The resulting savings for Sound Transit in this case was $80,000.

**SHOULDER WORK REVISED TO SAVE COSTS**
(C-6483, C.O.13)

This is another Sound Transit project that will provide direct access from the Ash Way Park and Ride Lot in South Snohomish County. Included in the early work was the widening of the SB shoulder. This work included cast-in-place barrier and shoulder paving with a Superpave mix. This paving was an early activity, separate from more significant work scheduled later in the job. The Contractor made a two-part proposal, to use Class A pavement in lieu of Superpave and to

substitute precast barrier for the cast-in-place work. The result, in addition to saving over $60 Thousand, avoided delays in obtaining Superpave mix design for the early work and avoided difficult sequencing of the barrier-paving work. The principal savings of the proposal, in the barrier work, could not have been realized during design. The Contractor's chosen approach to the work and the work plans of two subcontractors created the conditions for this cost-saving proposal. Sound Transit's share of the savings was $31,957.

**SUBSTITUTE CONDUIT LESS EXPENSIVE THAN PLAN**

The plans for a bridge construction job on NE 8th Street and SR 405 in Bellevue included a requirement for rigid, galvanized conduit for all ITS systems. The Contractor proposed the use of plastic (PVC) conduit in several non-critical locations. The State's share of the resulting savings amounted to $13,049. The design of these systems could have restricted the use of rigid conduit to only those areas where its extra strength and hardness were needed. The State would have realized the entire savings instead of 50%.

**ALTERNATE APPROACH TO SHOULDER CONSTRUCTION SAVES $$**
(C-6597, C.O.17)

This project adds an interchange to SR 167 in the North Sumner area. The work included reconstruction of the shoulders and was designed to be a full-time operation behind barrier after traffic lanes were narrowed and shifted. The Contractor proposed an alternate method, to forego the barrier and work sections of the shoulder at night using lane closures. The resulting savings in traffic barrier costs amounted to nearly $85 Thousand. The State's total savings was $42,229, five thousand dollars of which was in avoiding an overrun in pavement marking. The overrun, caused by a plan error, would have occurred had the CRIP not been proposed.

**ALTERNATE WORK PLAN REDUCES TRAFFIC CONTROL**
(C-6618, C.O.5)

This slope repair project on SR 291 northwest of Spokane included rock scaling. The plans provided for 24-hour one-lane traffic during the operation. This required extensive signing, driver information equipment and flagging. The Contractor proposed using a rubber protective mat in lieu of the planned sand blanket and working in short sections. This allowed the work to be done in day shifts only, with the mat and short barrier section removed daily to allow off-shift traffic. The idea not only reduced the impact on the public, but also saved nearly 10% of the expected project cost. The State's share of this savings amounted to $6,587. Future designs should at least consider this construction method and, if it is suitable for the work, implement it to recover the full amount of the savings.

# APPROVED CRIPS – Period Ending 9/30/2004



**GIRDER CHANGE SAVES TIME AND MONEY**
(C-6628, C.O.21)

This reconstruction project on SR 18 just east of I-5 in Federal Way included bridge work. The plans, for Structure 18/5 called for cast-in-place girders. The Contractor designed and proposed a substitution of pre-cast girders and offered, in addition to a share of the cost savings, a 32-day reduction in contract time. The time reduction increases the savings in tangible costs of traffic control as well as the intangible benefits of less time on the site. The dollar savings to the State of this proposal was $72,660. The use of pre-cast girders could have been included in the original design.

**ALTERNATE WALL DESIGN CHEAPER THAN PLAN**
(C-6628, C.O.20)

The same Highway 18 project just mentioned also contained a double-soldier pile wall. The Contractor hired a design consultant to review the wall and eventually proposed using a single piling instead. The alternate design was reviewed and found to be structurally acceptable. The State's share of the resulting savings was $141,447. The ultimate agreement also included a reduction in contract time of 17 working days. There is no need to fault the design of the original wall. In order to make the single pile design viable, the contractor had to take responsibility for assuring that his anchor tiebacks were placed very accurately to meet the tolerances of the revised design. This required voluntary extra effort and precision beyond that needed for the original design.

**ALTERNATE WALL DESIGN CHEAPER THAN PLAN—PART 2**
(C-6628, C.O.19)

Yet another proposal on the Highway 18 project led to the replacement of a cast-in-place concrete retaining wall with a welded wire mesh design to accomplish the same purpose. The savings of this proposal were smaller than the first change mentioned above, but the State still realized a price reduction of $47,041. There was no accompanying reduction in contract time.

# APPROVED CRIPS – Period Ending 9/30/2004



**BOX CULVERT REPLACED BY CONCRETE PIPE**
(C-6668, C.O.1)

This project adds channelization on SR 28 near the Town of Quincy. Included in this project was 3-sided box culvert necessary to span across an existing concrete-lined irrigation ditch. The Contractor proposed replacing this section of the concrete-lined ditch with a reinforced concrete pipe. While there was not a substantial savings (the State's share turned out to be $8,839), the alternate is expected to be easier to maintain and the total life-cycle cost should be lower. An additional benefit was realized in less impact on traffic during construction. There was no problem with the original design of this facility. The choice of box culvert versus pipe is a designer preference and there is no clear-cut indication here of which is better. The Contractor wanted to construct a pipe, the field office agreed and there was a minor savings. Sufficient reason to proceed with the CRIP.

**FIELD CONDITIONS ALLOWED CHEAPER TEMPORARY IMPACT ATTENUATOR**
(C-6720, C.O.10)

This is a bridge project on the new alignment of SR 395 in North Spokane. The plans included two temporary impact attenuators and called out systems "N-E-A-T" or "ADIEM 350." The actual field conditions allowed the use of a different system, the Type 1 Inertial Barrier shown in the Standard Plans. The alternate system was slightly less expensive and the State's share of the resulting savings amounted to $2,000. There is no reason to fault the original design. Based on the information available, the specified systems were necessary to fit into the available space.

# REMOVED FROM LIST – Period Ending 9/30/2004



## OFFERED SURFACING MATERIAL NOT SUITABLE

On a bridge project with minor roadway work, the Contractor proposed using crushed asphalt pavement in lieu of base course. The material would not have been free-draining, a critical requirement of surfacing, and the proposal was not accepted.

## ELIMINATION OF LANE CLOSURE DIDN'T WORK OUT

On a bridge scour repair job, the Contractor initially proposed placing material without utilizing a lane closure. Apparently the idea did not work out well as the Contractor withdrew the proposal. As it turned out, the operation with the lane closure went very well, resulting in savings for both the Contractor and the State.

## WALL REVISION PROPOSALS NOT ACCEPTABLE

On an interchange project, the Contractor submitted proposals for revisions to wall designs. During review, the initial cost savings were found to be illusory. There would have been a higher risk of failure and the Department chose to reject the proposal.

## UNABLE TO REACH PRICE AGREEMENT ON WALL PROPOSAL

On a widening project, the Contractor submitted a proposal to change the design of a retaining wall. The offered pricing included hypothetical savings as a benefit and incorporated steel price increases in the same discussion. The offered price for the substitute design could not be substantiated. Unable to reach a justifiable price agreement, the Department rejected the proposal.